

June 03, 2016

Meagan E. Ormand  
Golder Associates Inc.  
2108 W. Laburnum Ave.  
Suite 200  
Richmond, VA 23227

RE: Project: BREMO WEEKLY PROCESS  
Pace Project No.: 92299652

Dear Meagan Ormand:

Enclosed are the analytical results for sample(s) received by the laboratory on June 01, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Nicole Gasiorowski  
nicole.gasiorowski@pacelabs.com  
Project Manager

Enclosures

cc: Ron DiFrancesco, Golder Associates Inc.  
Martha Smith, Golder Associates Inc.  
Mike Williams, Golder Associates Inc



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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### Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174  
Alabama Certification #: 41320  
Connecticut Certification #: PH-0216  
Delaware Certification: FL NELAC Reciprocity  
Florida Certification #: E83079  
Georgia Certification #: 955  
Guam Certification: FL NELAC Reciprocity  
Hawaii Certification: FL NELAC Reciprocity  
Illinois Certification #: 200068  
Indiana Certification: FL NELAC Reciprocity  
Kansas Certification #: E-10383  
Louisiana Certification #: FL NELAC Reciprocity  
Louisiana Environmental Certificate #: 05007  
Maryland Certification: #346  
Michigan Certification #: 9911  
Mississippi Certification: FL NELAC Reciprocity  
Missouri Certification #: 236  
Montana Certification #: Cert 0074

Nebraska Certification: NE-OS-28-14  
Nevada Certification: FL NELAC Reciprocity  
New York Certification #: 11608  
North Carolina Environmental Certificate #: 667  
North Carolina Certification #: 12710  
North Dakota Certification #: R-216  
Oklahoma Certification #: D9947  
Pennsylvania Certification #: 68-00547  
Puerto Rico Certification #: FL01264  
South Carolina Certification: #96042001  
Tennessee Certification #: TN02974  
Texas Certification: FL NELAC Reciprocity  
US Virgin Islands Certification: FL NELAC Reciprocity  
Virginia Environmental Certification #: 460165  
Wyoming Certification: FL NELAC Reciprocity  
West Virginia Certification #: 9962C  
Wisconsin Certification #: 399079670  
Wyoming (EPA Region 8): FL NELAC Reciprocity

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### Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078  
North Carolina Drinking Water Certification #: 37706  
North Carolina Field Services Certification #: 5342  
North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001  
Florida/NELAP Certification #: E87627  
Kentucky UST Certification #: 84  
Virginia/VELAP Certification #: 460221

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### Asheville Certification IDs

2225 Riverside Drive, Asheville, NC 28804  
Florida/NELAP Certification #: E87648  
Massachusetts Certification #: M-NC030  
North Carolina Drinking Water Certification #: 37712

North Carolina Wastewater Certification #: 40  
South Carolina Certification #: 99030001  
Virginia/VELAP Certification #: 460222

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92299652001	T4-160601-1302-S3	EPA 1664B	JMS	1	PASI-C
		EPA 200.7	CKJ	1	PASI-O
		Trivalent Chromium Calculation	HEA	1	PASI-O
		EPA 200.8	HEA	10	PASI-O
		EPA 245.1	ANB	1	PASI-A
		SM 2540D	MJP	1	PASI-A
		EPA 218.7	AEM	1	PASI-O
		EPA 350.1	AES2	1	PASI-A
		SM 4500-CI-E	AES2	1	PASI-A

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** EPA 1664B

**Description:** HEM, Oil and Grease

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for EPA 1664B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Surrogates:**

All surrogates were within QC limits with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** EPA 200.7

**Description:** 200.7 MET ICP

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** Trivalent Chromium Calculation

**Description:** Trivalent Chromium Calculation

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for Trivalent Chromium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** EPA 200.8

**Description:** 200.8 MET ICPMS

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** EPA 245.1

**Description:** 245.1 Mercury

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** SM 2540D

**Description:** 2540D TSS, Low-Level

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** EPA 218.7

**Description:** Hexavalent Chromium by IC

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for EPA 218.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** EPA 350.1

**Description:** 350.1 Ammonia

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

**General Information:**

1 sample was analyzed for EPA 350.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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**Method:** SM 4500-CI-E

**Description:** 4500 Chloride

**Client:** Golder\_Dominion\_Bremo

**Date:** June 03, 2016

### General Information:

1 sample was analyzed for SM 4500-CI-E. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/27814

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92299588001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1746882)
- Chloride

### Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

Sample: T4-160601-1302-S3		Lab ID: 92299652001		Collected: 06/01/16 13:02		Received: 06/01/16 13:30		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
Field Data		Analytical Method:							
Collected By	L. HAMELMA N			1		06/01/16 13:07			
Collected Date	06/01/16			1		06/01/16 13:07			
Collected Time	13:02			1		06/01/16 13:07			
Field pH	8.2	Std. Units	0.10	1		06/01/16 13:07			
HEM, Oil and Grease		Analytical Method: EPA 1664B							
Oil and Grease	ND	mg/L	5.0	1		06/03/16 08:52			
200.7 MET ICP		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Tot Hardness asCaCO3 (SM 2340B)	75800	ug/L	3300	1	06/02/16 13:06	06/02/16 16:41			
Trivalent Chromium Calculation		Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	ND	ug/L	5.0	1		06/02/16 17:26	16065-83-1		
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	ND	ug/L	5.0	1	06/02/16 13:06	06/02/16 16:45	7440-36-0		
Arsenic	47.3	ug/L	5.0	1	06/02/16 13:06	06/02/16 16:45	7440-38-2		
Cadmium	ND	ug/L	1.0	1	06/02/16 13:06	06/02/16 16:45	7440-43-9		
Copper	ND	ug/L	5.0	1	06/02/16 13:06	06/02/16 16:45	7440-50-8		
Lead	ND	ug/L	5.0	1	06/02/16 13:06	06/02/16 16:45	7439-92-1		
Nickel	ND	ug/L	5.0	1	06/02/16 13:06	06/02/16 16:45	7440-02-0		
Selenium	ND	ug/L	5.0	1	06/02/16 13:06	06/02/16 16:45	7782-49-2		
Silver	ND	ug/L	0.40	1	06/02/16 13:06	06/02/16 16:45	7440-22-4		
Thallium	ND	ug/L	1.0	1	06/02/16 13:06	06/02/16 16:45	7440-28-0		
Zinc	ND	ug/L	25.0	1	06/02/16 13:06	06/02/16 16:45	7440-66-6		
245.1 Mercury		Analytical Method: EPA 245.1 Preparation Method: EPA 245.1							
Mercury	ND	ug/L	0.10	1	06/02/16 10:50	06/02/16 14:19	7439-97-6		
2540D TSS, Low-Level		Analytical Method: SM 2540D							
Total Suspended Solids	3.6	mg/L	1.0	1		06/02/16 10:55			
Hexavalent Chromium by IC		Analytical Method: EPA 218.7							
Chromium, Hexavalent	ND	ug/L	3.0	3		06/02/16 13:04	18540-29-9		
350.1 Ammonia		Analytical Method: EPA 350.1							
Nitrogen, Ammonia	ND	mg/L	0.20	1		06/02/16 11:40	7664-41-7		
4500 Chloride		Analytical Method: SM 4500-Cl-E							
Chloride	22.6	mg/L	5.0	1		06/02/16 13:16	16887-00-6		

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch: GCSV/25163

Analysis Method: EPA 1664B

QC Batch Method: EPA 1664B

Analysis Description: 1664 HEM, Oil and Grease

Associated Lab Samples: 92299652001

METHOD BLANK: 1747600

Matrix: Water

Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Oil and Grease	mg/L	ND	5.0	06/03/16 08:45	

LABORATORY CONTROL SAMPLE: 1747601

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	40	35.2	88	78-114	

MATRIX SPIKE SAMPLE: 1747602

Parameter	Units	35246515001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	3.4J	40	42.9	99	78-114	

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch: MERP/9530

Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1

Analysis Description: 245.1 Mercury

Associated Lab Samples: 92299652001

METHOD BLANK: 1746798

Matrix: Water

Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.10	06/02/16 14:08	

LABORATORY CONTROL SAMPLE: 1746799

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.5	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1746800 1746801

Parameter	Units	92299588001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.4	2.4	97	96	70-130	1	

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch:	MPRP/30803	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 MET
Associated Lab Samples:	92299652001		

METHOD BLANK: 1592826 Matrix: Water  
Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Tot Hardness asCaCO3 (SM 2340B	ug/L	ND	3300	06/02/16 16:21	

LABORATORY CONTROL SAMPLE: 1592827

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tot Hardness asCaCO3 (SM 2340B	ug/L	82700	83100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1592828 1592829

Parameter	Units	92299588001		MS		MSD		MS		MSD		% Rec		RPD	Qual
		Units	Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits					
Tot Hardness asCaCO3 (SM 2340B	ug/L		71.1 mg/L	82700	82700	153000	153000	99	99	70-130		0			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch:	MPRP/30804	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
Associated Lab Samples:	92299652001		

METHOD BLANK: 1592834 Matrix: Water  
Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	06/02/16 16:35	
Arsenic	ug/L	ND	5.0	06/02/16 16:35	
Cadmium	ug/L	ND	1.0	06/02/16 16:35	
Copper	ug/L	ND	5.0	06/02/16 16:35	
Lead	ug/L	ND	5.0	06/02/16 16:35	
Nickel	ug/L	ND	5.0	06/02/16 16:35	
Selenium	ug/L	ND	5.0	06/02/16 16:35	
Silver	ug/L	ND	0.40	06/02/16 16:35	
Thallium	ug/L	ND	1.0	06/02/16 16:35	
Zinc	ug/L	ND	25.0	06/02/16 16:35	

LABORATORY CONTROL SAMPLE: 1592835

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	50	49.2	98	85-115	
Arsenic	ug/L	50	50.9	102	85-115	
Cadmium	ug/L	5	5.1	102	85-115	
Copper	ug/L	50	50.8	102	85-115	
Lead	ug/L	50	50.0	100	85-115	
Nickel	ug/L	50	50.2	100	85-115	
Selenium	ug/L	50	53.2	106	85-115	
Silver	ug/L	5	5.1	102	85-115	
Thallium	ug/L	50	51.4	103	85-115	
Zinc	ug/L	250	258	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1592836 1592837

Parameter	Units	92299652001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Antimony	ug/L	ND	50	50	53.3	53.3	98	98	70-130	0	
Arsenic	ug/L	47.3	50	50	98.9	98.9	103	103	70-130	0	
Cadmium	ug/L	ND	5	5	4.9	5.0	98	99	70-130	1	
Copper	ug/L	ND	50	50	50.8	51.5	100	101	70-130	1	
Lead	ug/L	ND	50	50	50.5	50.8	101	101	70-130	1	
Nickel	ug/L	ND	50	50	51.4	51.9	100	101	70-130	1	
Selenium	ug/L	ND	50	50	52.7	53.5	102	104	70-130	1	
Silver	ug/L	ND	5	5	5.0	4.9	99	99	70-130	0	
Thallium	ug/L	ND	50	50	51.9	52.0	103	104	70-130	0	

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1592836 1592837											
Parameter	Units	92299652001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Zinc	ug/L	ND	250	250	251	255	100	101	70-130	2	

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch: WET/45284

Analysis Method: SM 2540D

QC Batch Method: SM 2540D

Analysis Description: 2540D Total Suspended Solids

Associated Lab Samples: 92299652001

METHOD BLANK: 1746788

Matrix: Water

Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	1.0	06/02/16 10:54	

LABORATORY CONTROL SAMPLE: 1746789

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	250	238	95	90-110	

SAMPLE DUPLICATE: 1746790

Parameter	Units	92299588001 Result	Dup Result	RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch: WETA/58373

Analysis Method: EPA 218.7

QC Batch Method: EPA 218.7

Analysis Description: Chromium, Hexavalent IC

Associated Lab Samples: 92299652001

METHOD BLANK: 1592999

Matrix: Water

Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	ug/L	ND	1.0	06/02/16 11:51	

LABORATORY CONTROL SAMPLE: 1593000

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	ug/L	.075	.071J	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1593001 1593002

Parameter	Units	92299652001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Chromium, Hexavalent	ug/L	ND	.22	.22	.7J	.71J	106	112	85-115	2	

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch:	WETA/27807	Analysis Method:	EPA 350.1
QC Batch Method:	EPA 350.1	Analysis Description:	350.1 Ammonia
Associated Lab Samples:	92299652001		

METHOD BLANK: 1746691 Matrix: Water  
Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	ND	0.20	06/02/16 11:21	

LABORATORY CONTROL SAMPLE: 1746692

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1746693 1746694

Parameter	Units	92299213001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits		
Nitrogen, Ammonia	mg/L	ND	2.5	2.5	2.5	2.5	100	98	90-110	1	

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## QUALITY CONTROL DATA

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

QC Batch:	WETA/27814	Analysis Method:	SM 4500-Cl-E
QC Batch Method:	SM 4500-Cl-E	Analysis Description:	4500 Chloride
Associated Lab Samples:	92299652001		

METHOD BLANK: 1746879 Matrix: Water

Associated Lab Samples: 92299652001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	5.0	06/02/16 13:11	

LABORATORY CONTROL SAMPLE: 1746880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.3	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1746881 1746882

Parameter	Units	92299588001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits		
Chloride	mg/L	89100 ug/L	10	10	98.1	98.0	90	89	90-110	0	M1

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## QUALIFIERS

Project: BREMO WEEKLY PROCESS

Pace Project No.: 92299652

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether, Styrene, and Vinyl chloride.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-A Pace Analytical Services - Asheville

PASI-C Pace Analytical Services - Charlotte

PASI-O Pace Analytical Services - Ormond Beach

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BREMO WEEKLY PROCESS


Pace Project No.: 92299652

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92299652001	T4-160601-1302-S3		FLD/		
92299652001	T4-160601-1302-S3	EPA 1664B	GCSV/25163		
92299652001	T4-160601-1302-S3	EPA 200.7	MPRP/30803	EPA 200.7	ICP/18415
92299652001	T4-160601-1302-S3	Trivalent Chromium Calculation	ICP/18416		
92299652001	T4-160601-1302-S3	EPA 200.8	MPRP/30804	EPA 200.8	ICPM/12446
92299652001	T4-160601-1302-S3	EPA 245.1	MERP/9530	EPA 245.1	MERC/9163
92299652001	T4-160601-1302-S3	SM 2540D	WET/45284		
92299652001	T4-160601-1302-S3	EPA 218.7	WETA/58373		
92299652001	T4-160601-1302-S3	EPA 350.1	WETA/27807		
92299652001	T4-160601-1302-S3	SM 4500-CI-E	WETA/27814		

## REPORT OF LABORATORY ANALYSIS

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	Document Name:	Document Revised: 26FEB2016
	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-MEC-CS-009-rev.02	Issuing Authority: Pace Mechanicsville Quality Office

Page 2 of 2 for Internal Use ONLY

**Sample Condition Upon Receipt**

Client Name:

Project #:

**WO# : 92299652**


Courier:

☐ Commercial

☒ Fed Ex

☐ UPS

☐ USPS

☐ Client

☒ Pace

☐ Other:

Custody Seal Present?

☒ Yes

☐ No

Seals Intact?

☒ Yes

☐ No

Packing Material:

☐ Bubble Wrap

☒ Bubble Bags

☐ None

☐ Other:

Thermometer:

☒ RMD001

☐

Type of Ice:

☒ Wet

☐ Blue

☐ None

☒ Samples on ice, cooling process has begun

Correction Factor: 0.0°C

Cooler Temp Corrected (°C):

4.8

Date/Initials Person Examining Contents: 6-1-16

RSB

Temp should be above freezing to 6°C

USDA Regulated Soil ( ☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

			COMMENTS:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.	
Rush Turn Around Time Requested?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.	Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.	
-Includes Date/Time/ID/Analysis Matrix: WW			
All containers needing acid/base preservation have been checked?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.	
All containers needing preservation are found to be in compliance with EPA recommendation?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)			
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC,LLHg	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Samples checked for dechlorination	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.	
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):			

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted:

Date/Time:

Comments/Resolution:

Project Manager SCURF Review:

NMG

Date:

6/2/16

Project Manager SRF Review:

NMG

Date:

6/2/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DENR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)

CHAIN-OF-CUSTODY / Analytical Request Document  
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information: Company: **Goldier Associates** Address: **2108 W Laburnum Ave, Ste 200 Richmond, VA 23227** Email To: **Mormand@golder.com** Phone: **804-551-0129** Fax: **804-358-2900** Requested Due Date/TAT: **24 HOUR**

Section B Required Project Information: Report To: **Mormand@golder.com** Copy To: **Martha\_Smith@golder.com** Purchase Order No.: **Ron\_Difrancesco@golder.com** Project Name: **Bremo Weekly Process** Project Number: **1520-347.200**

Section C Invoice Information: Attention: **Meagan Ormand** Name: **Goldier Associates** Address: **gairapdataentry\_invoices@golder.com** Site Location: **VA** STATE: **VA**

Section D Valid Matrix Codes MATRIX CODE (see valid codes to left) SAMPLE TYPE (G=GRAB C=COMP) DATE TIME DATE TIME SAMPLE TEMP AT COLLECTION # OF CONTAINERS Unpreserved H<sub>2</sub>SO<sub>4</sub> HNO<sub>3</sub> HCl NaOH Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> Methanol Other Analysis Test 200.8 - Sb, As, Cd, Cr (III) 200.8 - Pb, Ni, Se, Zn, Cu 200.8 - Ag, Th 245.1 - Hg 218.6(7) - Cr (VI) SM4500 - Chloride 1664B - Oil&Grease 350.1 - Ammonia-N SM2540D - TSS 200.7 - Hardness Residual Chlorine (Y/N) pH analysis @ 13.0°C, pH = 8.2

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	NaOH	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol	Other	Analysis Test	200.8 - Sb, As, Cd, Cr (III)	200.8 - Pb, Ni, Se, Zn, Cu	200.8 - Ag, Th	245.1 - Hg	218.6(7) - Cr (VI)	SM4500 - Chloride	1664B - Oil&Grease	350.1 - Ammonia-N	SM2540D - TSS	200.7 - Hardness	Residual Chlorine (Y/N)	pH analysis @ 13.0°C, pH = 8.2
1	SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE	WW	G	6/11/16	13:37	6/11/16	1500	1337	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2																														
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														
11																														
12																														

Section E ADDITIONAL COMMENTS: RELINQUISHED BY / AFFILIATION: **Goldier** DATE: **6/11/16** TIME: **1337** ACCEPTED BY / AFFILIATION: **Meagan Ormand** DATE: **6/11/16** TIME: **1500**

Section F SAMPLER NAME AND SIGNATURE: PRINT Name of SAMPLER: **Meagan Ormand** SIGNATURE of SAMPLER: **Meagan Ormand** DATE Signed (MM/DD/YY): **06/01/16**

Section G SAMPLE CONDITIONS: Temp in °C: **13.0** Received on Ice (Y/N): **N** Custody Sealed Cooler (Y/N): **N** Samples Intact (Y/N): **N**